DOCUMENT RESUME

ED 167 534 **SP 013 925**

AUTHOR	Silverman, Paul S.; Pecl, Kenneth W.
TITLE	Promoting Piagetian Beliefs: Theoretical Instruction vs. Inservice Experience.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C.
PUB DATE	13 Jan 78
GRANT	OEG-8-522478-4617
NOTE	15p.; Paper presented at the Annual Meeting of the Georgia Educational Research Association (Atlanta, Georgia, January 13, 1978).
EDRS PRICE	MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS	Academic Achievement; *Beliefs; *Change Strategies; Cognitive Development; Educational Philosophy; *Education Majors; *Learning Theories; Teacher Attitudes; Teacher Behavior; *Teacher Education; Teaching Methods; *Teaching Styles
IDENTIFIERS	*Piaget (Jean)

ABSTRACT

This study seeks to identify particular methods most likely to induce changes in philosophical beliefs of teachers compatible with a cognitive developmental teaching approach. Specifically examined were teacher's theoretical understanding in terms of epistemological beliefs consistent with either Piaget's theory of cognitive development or operant learning theory. The participants, 42 juniors entering preparation programs in elementary education and 29 experienced elementary teachers, were tested with regard to four scales: Piagetian beliefs, behavioral beliefs, belief intensity, and belief consistency. Three proposed hypotheses were verified: (1) teachers trained for one year to behave in a style consistent with Piagetian theory apparently do develop stronger beliefs in Piagetian epistemology than do preservice education majors who have taken a course in Piagetian theory; (2) while preservice education majors instructed only in Piagetian theory become less behavioristic, they do not become more Piagetian; (3) preservice education majors enrolled in an eclectic course presenting several theories, but emphasizing Piaget's, develop more Piagetian beliefs. The results are discussed in depth, and references are provided. (DS)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED167534

Second Annual Meeting of the

Georgia Educational Research Association

Atlanta, Georgia

January 13, 1978

MAR 14 10 54 AM '79

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Kenneth Pool

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

PROMOTING PIAGETIAN BELIEFS:

THEORETICAL INSTRUCTION vs. INSERVICE EXPERIENCE

Paul S. Silverman
Kenneth W. Pool

College of Education
and
Mathemagenic Activities Program-Follow Through

The research that led to this paper was supported in part by the Mathemagenic Activities Program-Follow Through (H.C. Hawn, Director, C.D. Smock, Director, 1969-1976) under Grant No. OEG-8-522478-4617 (287), HEW, Office of Education. The opinions expressed in the paper, however, do not necessarily reflect the position or policy of the U.S. Office of Education, and no official endorsement by the U.S. Office of Education should be inferred.

SP013925

INTRODUCTION

Recent research on the effects of teacher practices upon pupil achievement suggests that classrooms oriented toward cognitive development do not consistently produce positive results on tests of pupil achievement. While the lack of positive effects may be attributed to the failure of teaching strategies such as learning-by-doing, free social interaction, stage appropriate instruction, and non-directive teaching styles, it is equally probable that these "ideal" teaching styles are inadequately understood and are therefore not properly implemented in classrooms. Additionally, it is apparently difficult to train teachers to properly apply cognitive approach teaching styles. For example, in a study of the National Follow Through Program (Stallings & Kaskowitz, 1974) a variety of educational models classified as cognitive, socioemotional, and behavioral were compared. Only the behavioral models were consistently implemented. Behavioral models can be implemented by providing teachers with behavioral methodologies; it is likely, however, that cognitive models require that teachers have a strong theoretical understanding and belief in theory for effective implementation.

PURPOSE

The present study was initiated with the intent of identifying particular methods most likely to induce changes in philosophical beliefs compatible with a cognitive developmental teaching approach. Specifically examined were teachers' theoretical understanding in terms of epistemological beliefs consistent with either Piaget's theory of cognitive development or operant learning theory. Briefly, the two epistemologies distinguishing these theories are "constructivism" (knowledge of the world arises

from internal mental structure) and "realism" (the world directly imposes itself on the individual). These contrasting epistemologies are relevant to educators since they potentially distinguish between the teacher as a "facilitator of discovery" or as a "disseminator of facts." Brown (1968) has obtained evidence to support the relevance of epistemology to teaching style; that is, philosophical beliefs do influence actual classroom teaching behavior. The particular methods by which epistemological beliefs may be influenced should be of concern to educators involved in teacher preparation since they may determine program effectiveness and ultimately pupil performance.

Ongoing research appears to indicate that dramatic changes in teacher beliefs and classroom styles may be effected upon preservice teachers. The relationships between teacher beliefs and teacher behavior in "open" education versus individually guided education (IGE) was investigated by Claytor (1974). The results of the study indicate that prospective teachers are more "open" in their beliefs than IGE or traditional teachers. Danne (1976) investigated the effects of two field-based courses on the attitudes of preservice elementary teachers and found upper division students had more positive attitudes than lower division students. Theory has been espoused to be an important ingredient for the improvement of early childhood programming (Verma & Peters, 1973). After investigating the relationships between Piagetian and behavioral teacher belief systems and actual teacher practices, it was noted that "theory is little applied as either a policy for guiding practice or as an after-the-fact explanation for practice" (p. 53). Studies by Bogut & McFarland (1975) and Severy (1974) indicate that the belief systems or classroom practices of inservice teachers are relatively stable and require intensive effort to modify.

For the present study, a belief has been defined as a statement with

which an individual agrees. Researchers such as Bem (1970) and Rokeach (1968) suggest that beliefs exist as systems. In such a framework, agreement with statement A should exist in relation to agreement with statement B, and the two should be consistent with one another. In fact, Festinger (1957) set the stage for subsequent analyses of beliefs by suggesting that humans change beliefs in order to avoid inconsistency. More recently, theorists such as Abelson (1968) have speculated that separate belief "constellations" may exist in isolation from each other, thereby avoiding conflict. Nevertheless, for the educator the idea that beliefs are inter-related and that they change through resolutions of conflict is a useful one, especially if beliefs and subsequent teacher practices are correlated. Preservice and inservice programs thus need to determine whether appropriate conflict-producing situations are provided to undergraduates or teachers.

We have asked the question, "What experiences are likely to create the sorts of conflicts which ultimately alter philosophical beliefs?" To provide an answer we have examined three types of pre- and inservice instructional experiences:

1. The long-term inservice instruction of a Piagetian-based early childhood education model.
2. A preservice course concentrating solely upon Piagetian theory and its implications for teaching.
3. A preservice course introducing several theories relevant to education, but emphasizing Piagetian theory.

In turn, we have suggested some possible effects of such experiences:

1. Teachers trained to use styles consistent with Piaget's theory appropriately adjust their philosophical beliefs. Festinger's theory suggests that conflicts between one's

beliefs and behavior often result in changes in beliefs rather than behavior.

2. Preservice students instructed in only Piagetian theory and given clinical experiences administering Piagetian tasks, may not develop epistemological beliefs consistent with the theory. Students, unlikely to have developed coherent philosophical systems, may find the lack of awareness of several alternative theories mitigates against development of particular beliefs, since the opportunity for conflict resolution is not offered.
3. Preservice students briefly instructed in several theories, including Piagets's, but given clinical experience administering only Piagetian tasks, may acquire beliefs consistent with Piaget's. In this environment, students are presented with potentially conflicting theories and are given the opportunity to resolve conflicts through experiential tests of Piaget's theory.

The three types of instructional experience can be described as varying in terms of a three-dimensional system: The opportunity for practical experiences by which beliefs are behaviorally tested; the opportunity for learning the "target" theory; the opportunity for learning alternative theories. Having learned the target theory, conflict can be created either by learning an incompatible theory or through practical experiences to which the theory is potentially applicable. If these dimensions are relevant to belief change, we would predict that either "Piagetian" teaching experience or an "eclectic" course emphasizing Piaget's theory are effective methods for promoting philosophies consistent with Piagetian theory.

METHODS AND PROCEDURES

Subjects

Forty-two juniors entering preparation programs in Elementary Education at the University of Georgia and 29 experienced elementary teachers (grades 1 - 3) in the southeast participated in the study. The college students had been non-systematically assigned to one of two Field Experience teams and the accompanying Educational Foundations courses. Thirty were enrolled in a 14-hour course covering (1) Piaget's theory of cognitive development, (2) implications of the theory for teaching style and (3) clinical experience administering Piagetian tasks to children. The remaining 12 students were enrolled in a 30-hour "eclectic" foundations of education course examining (1) historical perspectives in education, (2) generic teaching competencies, (3) modern influences on teaching practices (e.g., Piaget, Bruner, Erikson, and various educational models), and (4) experience administering Piagetian tasks to children.

Experienced teachers also formed two groups: 22 teachers were members of the Mathemagenic Activities Program-Follow Through, a Piagetian-based instructional program, and received practical advice and training from local facilitators knowledgeable in Piaget's theory. These teachers joined the Follow Through program as new teachers and, for this study, were examined as three different "experience" groups: one year teaching experience, two years, and three to five years. Seven other first-year teachers not in the Follow Through program formed a comparison group, having received no training in Piagetian teaching styles.

In summary, there were six treatment groups: "Piagetian Education Majors", "Eclectic Education Majors", "Piagetian 1-year Experienced Teachers", "Piagetian 2-year Experienced Teachers", "Piagetian 3-5-year Experienced Teachers", and "Traditional 1-year Experienced Teachers."

Procedure

In September, 1977 all education majors were administered the Kaufman "Teachers' Beliefs Inventory" (Kaufman, Frelich, & Edenhart-Pepe, 1975), a 24-item instrument designed to assess epistemological beliefs consistent with Piagetian and behavioral theories. Four months later (December, 1977) following completion of a Foundations course, the Inventory was re-administered. While the initial design called for administration of the inventory to experienced teachers during the same two months, an inadequate return rate necessitated a modification. Inventories administered to teachers in May, 1977 were used instead.

The Teachers' Belief Inventory examines epistemological beliefs in four areas: the nature of knowledge, the nature of the act of knowing, the nature of representation, and the nature of intellectual development. The 24 statements composing the instrument are randomly ordered--12 Piagetian and 12 Behavioral. The respondent is asked to record his agreement with each statement on a six point scale varying from strong to moderate to slight agreement or disagreement. Two representative statements are "In order to understand an idea, the individual must invent it for himself" (Piagetian) and "Knowledge can be gained directly from sensory experience" (Behavioral).

Four scales were developed and used for this study: (1) Piagetian Beliefs (12-72 points), (2) Behavioral Beliefs (12-72 points), (3) Belief Intensity (0-69 points), and (4) Belief Consistency (0-60 points). The first two are straightforward totals of responses to relevant items. Belief Intensity is defined by assigning point values to all strong, moderate, and slight responses, regardless of whether they referred to agreement or disagreement. Belief Consistency is defined as the absolute difference between Piagetian and Behavioral Belief scores.

Two types of analyses were applied to each scale. First, a one-way ANOVA

was used to compare the six groups (the post-treatment December scores of the Education Majors were used). Duncan's Multiple Range Test was used to locate specific differences. Second, a t-test was applied to the pre- and post-treatment tests of Piagetian Education Majors and to the pre- and post-treatment tests of Eclectic Education Majors. All significance levels were established using 2-tailed tests.

RESULTS

Results are presented with respect to each outcome scale. Table 1 contains means, standard deviations, and sample sizes for all groups on all measures.

Insert Table 1 About Here

Piagetian Beliefs. A one-way ANOVA comparing the 6 groups yielded an F-ratio approaching significance: $F(5,65)=2.16$, $p<.10$. The multiple contrasts test suggested that Piagetian 1-year Experienced Teachers maintained beliefs more consistent with Piaget's theory than did Piagetian Education Majors. A t-test for paired observations (pre- and post-treatment) applied to Piagetian Education Majors revealed no significant change ($t=1.35$, df 29, $p<.10$). A similar analysis applied to Eclectic Education Majors suggested an increase, approaching significance, in Piagetian beliefs ($t=2.09$, df 11, $p<.10$).

Behavioral Beliefs. The one-way ANOVA resulted in a highly significant F-ratio: $F(5,66)=3.33$, $p<.01$. Piagetian 3-5-year Experienced Teachers were more behavioral than either group of Education Majors. T-tests showed that while the behavioral beliefs of Piagetian Education Majors decreased ($t=2.92$, df 29, $p<.01$), the beliefs of Eclectic Education Majors did not change ($t=.881$, df 11, $p<.10$).

Belief Intensity. A significant F-ratio resulted, with Piagetian Ex-

TABLE 1

Belief Scores†

	t_1		t_2		
	$\bar{X}$	S.D.	$\bar{X}$	S.D.	N
PIAGETIAN BELIEFS*					
Piagetian Course	26.07	(4.09)	27.16	(4.63)	30
Eclectic Course	26.67	(5.42)	24.50	(5.60)	12
1 Yr. Piagetian Exp.			21.00	(3.69)	6
2 Yr. Piagetian Exp.			23.00	(6.11)	7
3-5 Yr. Piagetian Exp.			24.22	(5.83)	9
1 Yr. Traditional Experience			25.86	(4.18)	7
BEHAVIORISTIC BELIEFS*					
Piagetian Course	37.81	(5.54)	40.45	(6.21)	31
Eclectic Course	38.50	(6.20)	39.83	(4.95)	12
1 Yr. Piagetian Exp.			35.33	(7.03)	6
2 Yr. Piagetian Exp.			35.57	(7.18)	7
3-5 Yr. Piagetian Exp.			32.89	(4.31)	9
1 Yr. Traditional Experience			35.86	(4.06)	7
BELIEF INTENSITY					
Piagetian Course	20.10	(8.08)	16.28	(8.29)	29
Eclectic Course	18.83	(10.59)	19.67	(8.75)	12
1 Yr. Piagetian Exp.			27.17	(6.71)	6
2 Yr. Piagetian Exp.			25.43	(11.93)	7
3-5 Yr. Piagetian Exp.			26.89	(8.13)	9
1 Yr. Traditional Experience			22.29	(6.13)	7
BELIEF CONSISTENCY					
Piagetian Course	12.07	(4.40)	13.69	(7.31)	29
Eclectic Course	11.83	(4.84)	15.33	(6.08)	12
1 Yr. Piagetian Exp.			14.83	(9.00)	6
2 Yr. Piagetian Exp.			12.58	(5.97)	7
3-5 Yr. Piagetian Exp.			9.11	(5.49)	9
1 Yr. Traditional Experience			10.29	(4.86)	7

*Score range was 12, for high belief, to 72, for low belief.

†Solid lines indicate statistically significant differences

perienced Teachers at all three levels of experience maintaining more intense beliefs than Piagetian Education Majors: $F(5,64)=3.76$, $p<.01$. T-tests showed that the belief intensity of Piagetian Education Majors decreased ($t=2.93$, df 28, $p<.01$), while there was no change for Eclectic Education Majors ($t=.369$, df 11, $p>.01$).

Belief Consistency. The ANOVA revealed no differences among the 6 groups, $F(5,64)=1.27$, $p>.05$. T-tests showed that while the belief consistency of Piagetian Education Majors did not change ($t=1.48$, df 28, $p>.05$) the Eclectic Education Majors became more consistent ($t=2.76$, df 11, $p<.02$).

DISCUSSION

The three proposed effects identified earlier were supported:

1. Teachers trained for one year to behave in a style consistent with Piagetian theory apparently do develop stronger beliefs in Piagetian epistemology than do preservice education majors who have taken a course in Piagetian theory.
2. While preservice education majors instructed only in Piagetian theory become less behavioristic, they do not become more Piagetian.
3. Preservice education majors enrolled in an "eclectic" course presenting several theories, but emphasizing Piaget's, develop more Piagetian beliefs.

While small and unequal sample sizes preclude definitive conclusions, these results do suggest that conflict generated either between behavior and beliefs (via teaching experience and inservice counseling) or among beliefs (via an eclectic course with a Piagetian emphasis) may facilitate a change in epistemological beliefs. Though the Piagetian course offered a depth of theoretical

information, belief in this information did not ensue--possibly because there was no opportunity to test this theory against others.

An examination of belief intensity and belief consistency scores supports this interpretation and suggests a pattern of change. The conflict model of belief change is consistent with Piaget's own description of the equilibratory process by which cognitive structures develop (Piaget, 1972). Equilibration involves a period during which a structure is stable, followed by disequilibration--a time of confusion and vacillation of judgment. Piaget calls this a "transition" phase. As a result of this conflict or confusion, a new, more stable mental structure is generated. The individual accommodates. With respect to change in belief systems, we might anticipate that the beliefs of a person in a transitional phase will be less intense and less consistent than at other periods. Our data suggest that the beliefs of college education majors become less intense following both introductory courses. Overall, Piagetian Experienced Teachers held more intense beliefs than Piagetian Education Majors. In the Eclectic course, the one course that engendered Piagetian beliefs, all beliefs became more consistent.

Two unexpected results produce interpretational problems. First, none of the analyses involving Traditional 1-year Experienced Teachers led to conclusions that this group was significantly different from any of the other groups with which it was compared. This result points to a more general finding. Even where statistically significant differences were found, there were relatively small absolute differences among all belief scores. For the most part, all groups were "moderates" with respect to specific beliefs as well as to intensity and consistency of beliefs. Whether this lack of differences reflects an insensitive instrument or the irrelevance of epistemological issues to the participants remains to be examined.

A second rather surprising result was that while Piagetian 1-year Experienced

Teachers were more "Piagetian" than Piagetian Education Majors, a predicted result, Piagetian 3-5-year Experienced Teachers were more behavioral than both groups of Education Majors. We do have an ad hoc explanation for these apparently contradictory findings. It is likely that the "facilitators"--the inservice "trainers"--concentrate their energies on new teachers each year. This would account for the Piagetian beliefs of 1-year teachers in the Follow Through Program. Teachers who have been with the program for more than one year may receive less attention from facilitators. In the absence of continual intense inservice training these teachers may have acquired a behavioral philosophy because it is an intuitively appealing one. A behavioral epistemology permits the teacher to feel that he or she has a direct impact on the students in the classroom. In fact, Table 1 shows a yearly increase in behavioral beliefs and a yearly decrease in Piagetian beliefs, though these trends were not statistically significant.

Given these results and the interpretation that a conflict resolution model is not incompatible with them, two conclusions relevant to the educators of teachers may be made. The presentation of alternative theories coupled with opportunities for the practical testing of one theory apparently promotes belief in a philosophy consistent with that theory. Long term inservice training of practical teaching strategies which allow for testing of beliefs against practices also appears to promote the development of a philosophy consistent with those strategies. In fact, extensive training of a teaching style, when closely coupled to the practical problems faced by teachers, may be a more effective means of creating belief change than are single courses offered by relatively unstructured undergraduate programs.

References

Abelson, R.P. Computers, polls, and public opinion--some puzzles and paradoxes. Transactions, 1968, 5, 20-27.

Bem, D.J. Beliefs, attitudes, and human affairs. Belmont, CA: Brooks/Cole, 1970.

Bogut, T.L. & McFarland, B.L. The effects of instruction on elementary teachers' realistic and idealistic attitudes toward selected science reconcepts. Paper presented at the national convention of the National Science Teachers Association, Los Angeles, 1975.

Brown, B.B. The experimental mind in education. New York: Harper and Row, 1968.

Claytor, M. The relationship between teacher beliefs and classroom evidences of teacher behavior in open education as compared in IGE (individually guided education) and non IGE schools. Dissertation Abstracts International, 1974, 35(A), 3571-3572.

Danne, C.J. Attitudinal changes toward teaching of preservice elementary teachers before and after two required field-based courses at Michigan State University. Dissertation Abstracts International, 1976, 36(9-A), 5800-5802.

Festinger, L. A theory of cognitive dissonance. Evanston, Ill.: Row-Peterson, 1957.

Kaufman, B.A., Frelich, A., & Edenhart-Pepe, M. Standardization of a Piaget-based pre-school teachers' beliefs inventory. Unpublished paper, 1975, Washington University, St. Louis, Mo.

Piaget, J. Problems of equilibration. In C.F. Nodine, J.M. Gallager, & R.D. Humphreys (Eds.), Piaget and Inhelder on equilibration. Philadelphia: The Jean Piaget Society, 1972.

Rokeach, M. Beliefs, attitudes, and values. San Francisco, CA: Josey-Bass, 1968.

Severy, L. Procedures and issues in the measurement of attitudes. Tests and Measurements Report No. 30. ERIC Clearinghouse on Tests, Measurements, and Evaluation. Princeton, New Jersey. NIE Report # ETS TM-30, December, 1974.

Stallings, J. & Kaskowitz, D. Follow-Through classroom observation evaluation 1972-73. SRI Project URU-7370, August, 1974. Standard Research Institute.

Verma, S. & Peters, D.L. Day care teacher practices and beliefs. The Alberta Journal of Educational Research, 1975, 21(1), 46-55.